MaThink Conference 2010

Using Algebra Tiles to Bridge Gaps and to Foster Understanding

Presented by: Jennifer Winter

Addition and Subtraction of Integers

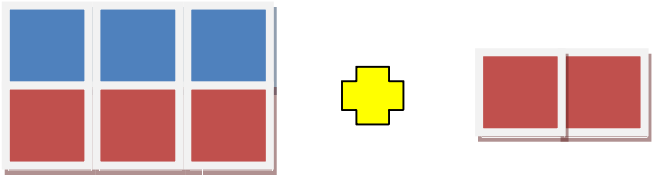
In order to simplify many calculations we will rely on the idea of "zero pairs". Once we create a zero pair, we will remove it from our calculation.

Example 1: $2+4$

This gives us no zero pairs, so we simply count the number of positive ones. We have a total of 6, so we conclude $2+4=6$.

Example 2: $3+(-5)$

This time, we will have zero pairs as we have both positive ones and negative ones.
We rearrange our tiles to look like this:



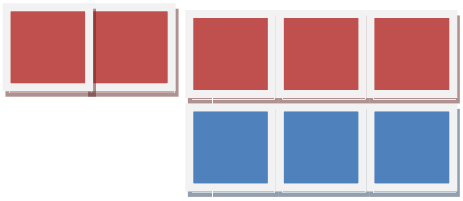
Then as we said above, our zero pairs may be removed from our calculation. This leaves us with just two negative tiles. So we will conlude that $3+(-5)=-2$.

Example 3: $-2-3$

Here we begin with two negative tiles, and we want to take 3 positive tiles from it.

So far, we have:

If we are going to subtract some positive tiles, I might need to use some zero pairs. Notice that having two negative tiles is the same as having the following:



Now we are ready to subtract 3 positive ones. This leaves us with:

Then we conclude that $-2-3=-5$

Now it is your turn. Use the tiles below to complete the following examples. You may want to try these with your algebra tiles first before completing the examples below.

Example 4: $3-7$

Did you need to add some zero pairs?

How many did you need?

So what is $3-7$?

Example 5: $1+(-3)$

Do we need to add zero pairs? Why or why not?

What is $1+(-3)$?

Example 6: $-5+4$

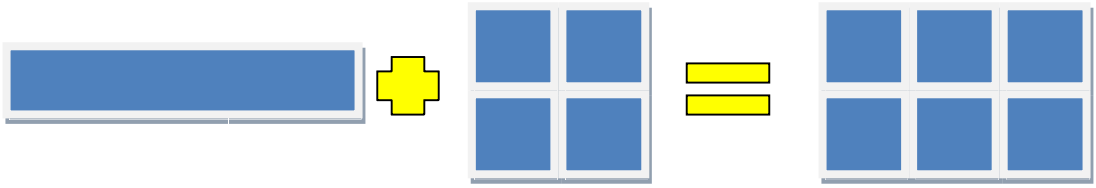
Did we add zero pairs this time? Why or why not?

When do you think it is necessary to add zero pairs?

Solving a simple linear equation

When solving a linear equation, we will need to still rely on our use of zero pairs, but this time in an attempt to isolate our variable *x*. We will begin each problem by setting up our board to mirror our equation.

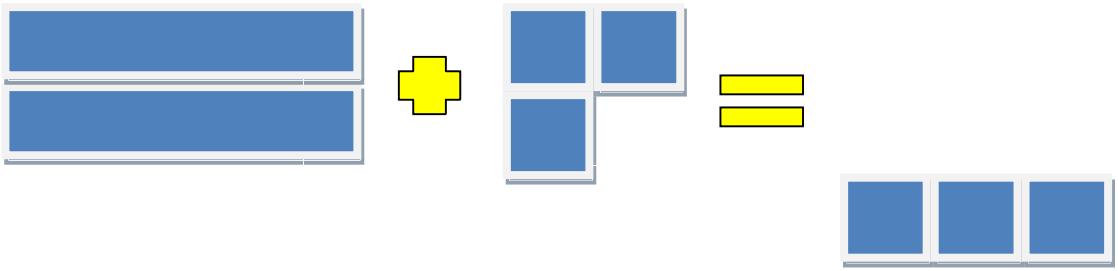
Example 1: $x+4=6$



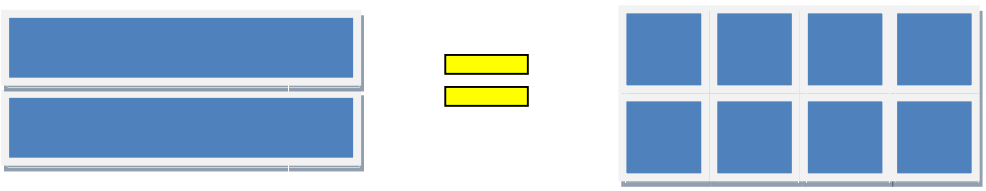
What should we do to isolate our *x*? Well we need to get rid of the 4 positive one tiles on the left hand side of the equation. We can remove them by simply subtracting 4 positive ones from each side of the equation.

Then we can conlude that $x=2$.

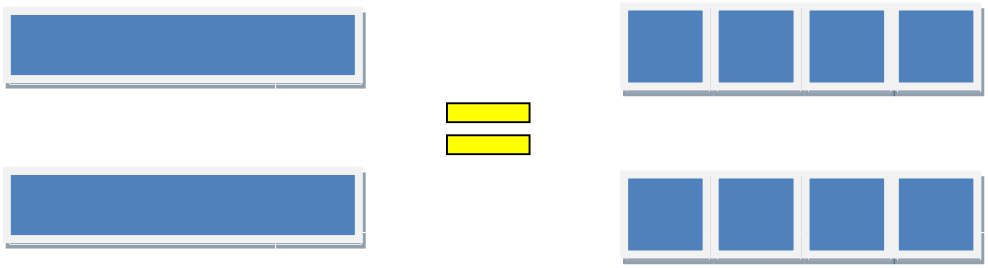
Example 2: $2x+3=11$



Now we can simply subtract 3 positive ones from each side of our equation to obtain:



But we want the value of just one *x* and we have 2 of them. So we need to divide things up equally, as below:



We can now see that each *x* has a value of 4. So the solution to our equation above is $x = 4$.

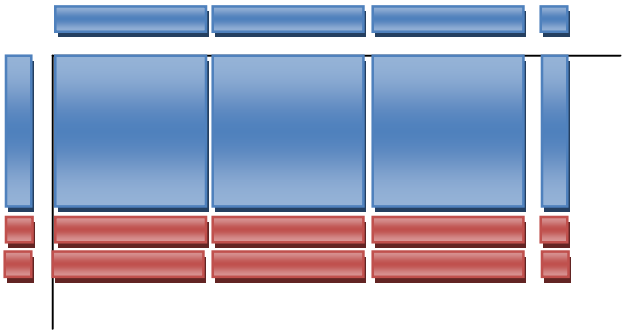
Now it's your turn. Use the equation and space below to draw our your solution to the equation.

Example 3: $3x - 5 = 7$

Multiplying Binomials

We will show how to multiply binomials by using an area model.

Example 1: $(3x+1)(x-2)$



We can see from our area model that when we multiply our binomials together, the product is $3x^2+x-6x-2$, but this has not been simplified as we still have zero pairs. We simplify our product to $3x^2-5x-2$.

Example 2: $(x-3)(x+4)$

Set up an area model for Example 2, and then simplify your product.